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WILLIAM C. ACKERMANN, CHIEF

March 1971

Subject: Technical Letter 5a
Lake Evaporation in Illinois

Illinois has about 370 reservoirs and lakes that are 40 acres or larger. In addition, the state is bordered by three major rivers and is drained internally by six large rivers and many smaller ones. There are also more than 26,000 farm ponds having areas under six acres. Together they cover more than 300 square miles.

Most of the impoundments in Illinois are shallow, and the average annual loss of water by evaporation varies from 30 inches in the north to 38 inches in extreme southeastern Illinois, as shown in figure 1.

Evaporation can be measured directly by observing the daily water loss from exposed pans of water. Illinois has records extending back to 1941 of evaporation from standard National Weather Service evaporation pans. However, there are other methods for determining evaporative losses which take into account easily obtainable meteorological observations. The Water Survey has used a modified energy budget approach employing air temperature, dew point temperature, solar radiation, and wind movement to obtain lake evaporation from the nomograph shown in figure 2.

The arrows in figure 2 indicate the solution to a sample case which has an average daily air temperature of 81°F, an average solar radiation of 600 langleys per day, a 55°F dew point, and an average daily wind movement of 120 miles.

At the upper left quadrant of figure 2, a horizontal line passes from the 81°F mark to the first intersection at the 600-langley curve, and projects toward the right to the intersection of the 55°F dew point curve. At this point a vertical line runs downward to the curve of the 120-mile wind movement, from where a horizontal line projects toward the left to intersect a vertical line from the first intersection. The average daily lake evaporation, 0.27 inch, is read at this point.

Monthly values of lake evaporation are available in Water Survey Report of Investigation 57, *Lake Evaporation in Illinois*, by W. J. Roberts and J. B. Stall, which also provides data on maximum net evaporation (total lake evaporation minus expected rainfall) for recurrence intervals up to 50 years and for periods up to 60 months.

Very truly yours,

William C. Ackermann

William C. Ackermann

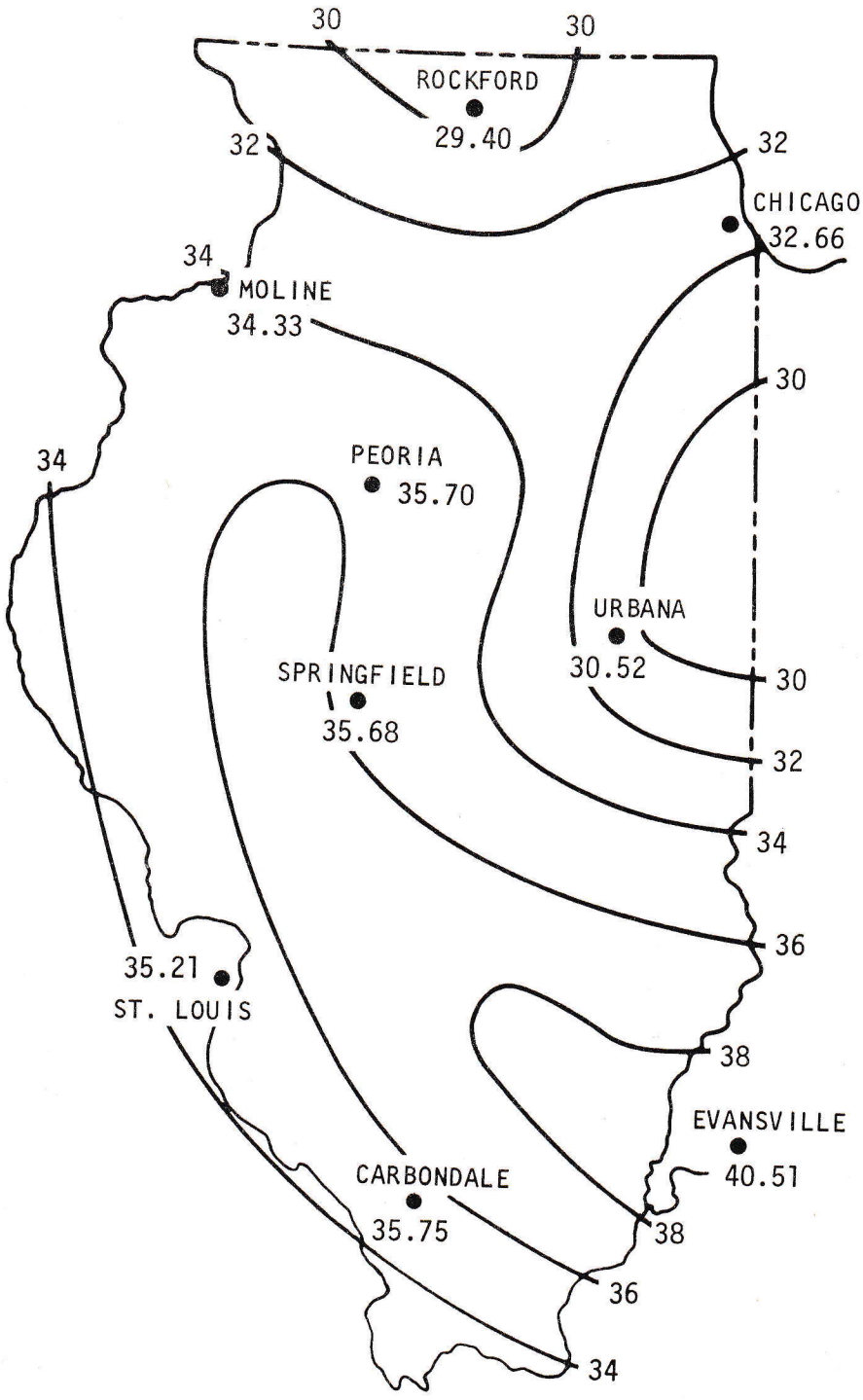

Figure 1. Average annual lake evaporation in inches

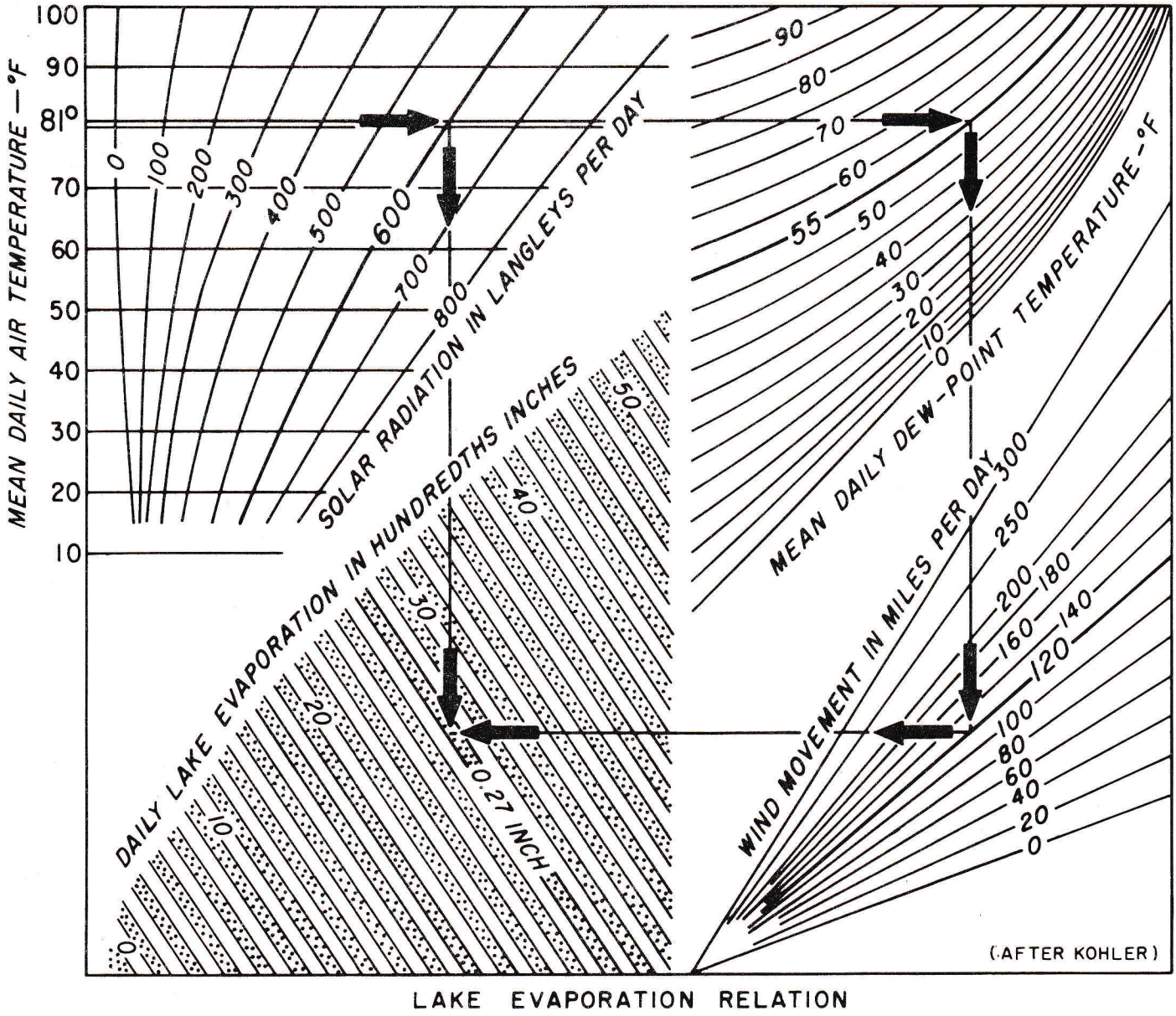

Figure 2. Lake evaporation nomograph